

Appl. No. 10/816,015
Amdt. Dated December 21, 2005
Reply to Office Action of September 21, 2005

REMARKS/ARGUMENTS

This amendment is responsive to the Office Action mailed on September 21, 2005. In the Office action claims 1-44 were rejected.

Claims 6, 7, 19, 20, 22, 31, 32, and 34 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter.

Claims 1, 27-32, 39, 41, and 43 were rejected under 35 U.S.C. §102 (b) as being anticipated by Price et al. (U.S. Publication No. 2002/0085674, hereinafter "Price"). Claim 1 was rejected under 35 U.S.C. §102 (b) as being anticipated by Burke et al. (U.S. Patent No. 5,305,363).

Claims 2, 13, 38, and 42 were rejected under 35 U.S.C. §103 (a) as being unpatentable over Price in view of Richey et al. (U.S. Patent No. 4, 547, 892, hereinafter "Richey"). Claim 9 was rejected under 35 U.S.C. §103 (a) as being unpatentable over Price and Richey in view of Hu et al. (U.S. Patent No. 6,047, 040). Claim 10 was rejected under 35 U.S.C. §103 (a) as being unpatentable over Price and Richey in view of Nambu et al. (U.S. Patent No. 5, 412, 562). Claim 12 was rejected under 35 U.S.C. §103 (a) as being unpatentable over Price and Richey in view of Zhou et al. (U.S. Publication No. 2002/0094064). Claim 14 was rejected under 35 U.S.C. §103 (a) as being unpatentable over Price and Richey in view of Dunham et al. (U.S. Patent No. 6, 385, 292). Claims 2, 5, 6, 8, 11, and 19 were rejected under 35 U.S.C. §103 (a) as being unpatentable over Burke and Richey. Claims 3, 4, 7 were rejected under 35 U.S.C. §103 (a) as being unpatentable over Burke, Richey in view of Price. Claims 15-18, 20, 25, 26, 40, 44 were rejected under 35 U.S.C. §103 (a) as being unpatentable over Price in view of Dafni et al. (U.S. Patent no. 5, 966, 422). Claim 21 was rejected under 35 U.S.C. §103 (a) as being unpatentable over Price and Dafni in view of Dawson (US Patent No. 5, 467, 377). Claim 22 was rejected under 35 U.S.C. §103 (a) over Price, Dafni, Dawson in view of Baker et al. (5, 259, 012). Claims 23 and 24 were rejected under 35 U.S.C. §103 (a) as being unpatentable over Price, Dafni, in view of Subramanyan et al. (6,782,284). Claim 33 was rejected under 35 U.S.C. §103 (a) as being unpatentable over Price in view of Dawson. Claim 35 was rejected under 35 U.S.C. §103 (a) as being unpatentable over Price in view of Hu. Claim 36 was rejected under 35 U.S.C. §103 (a) as being unpatentable over Price in view of Nambu et al. Claim 37 was rejected under 35 U.S.C. §103 (a) as being unpatentable over Price in view of Burke. Claim 38 was rejected under 35 USC §103 (a) as being unpatentable over Price in view of Richey.

In this amendment, claims 1, 22, 34, 37 and 41 have been amended. No new matter has been added. Claims 1-44 remain pending in this application. Reconsideration in view of the amendments and following remarks is respectfully requested.

Appl. No. 10/816,015
Amdt. Dated December 21, 2005
Reply to Office Action of September 21, 2005

112 rejections

With respect to claims 6, 7, 19, 20, 31 and 32, Applicant respectfully traverses the 112 rejections. Applicant respectfully submits that there is adequate support for different types of lines sources in paragraphs [0035] and [0036]. Further FIGS. 8-10 also support the claims in defining different configurations and arrangements of line sources. As described in these paragraphs and as shown in the drawings, the lines sources are not necessarily one-dimensional arrays as concluded by the Examiner. The Applicants therefore respectfully requests the withdrawal of 112 rejections with respect to claims 6, 7, 19, 20, 31 and 32.

With respect to claims 22 and 34, Applicant has amended these claims in accordance with the Examiner's helpful suggestion and requests that the 112 rejections to be withdrawn.

Claims define allowable subject matter over the applied art

The independent claims 1, 37, and 41 were rejected under 35 U.S.C. §102 (b) over Price. Claim 1 was also rejected under 35 U.S.C. §102 (b) over Burke. Applicant has carefully reviewed the applied references, and has amended the independent claims 1, 37, and 41 to recite the subject matter more clearly in order to distinguish from the applied references. No new matter has been added. Applicant respectfully traverses the rejection of independent claims 1, 37, and 41, as amended, under 35 U.S.C. §102 (b) as being anticipated by Price and also traverses the rejection of independent claims 1, 37, and 41, as amended, under 35 U.S.C. §102 (b) as being anticipated Burke. To anticipate a claim under 102, each and every element of the claim must be taught by the reference.

Independent claims 1, 37, and 41 have been amended to include the recitation of X- ray sources "arranged substantially surrounding an imaging volume". Support for this amendment can be found in the detailed description in paragraphs [0026], [0028] and [0032]. The data being acquired in the Applicant's invention is volumetric data and this aspect has also been added to the independent claims 1, 37, and 41. Independent claims 1, 37, and 41 have been further amended to include the recitations of "a source controller for triggering one or more emitters in the one or more distributed X-ray sources for acquiring volumetric data by the one or more detectors". Support for this amendment can be found in paragraphs [0021], [0022], and [0026].

Price discloses a "third generation" CT scanner in which both the X-ray source and the detectors rotate about a center of gravity (see paragraph [0015] and paragraph [0016]). In the scanner arrangement in Price, both X-ray source and the detector both need to be rotated during a scan to acquire the projection data. Further, the X-ray source as disclosed in Price is not a distributed source but a unitary source with a cold cathode emitter. The Examiner himself has accepted that Price does not teach distributed X-ray source surrounding an imaging volume. In the Office action dated September 21, 2005, on page 14, line 7, the Examiner states, "Price et al. fail to teach

Appl. No. 10/816,015
Amdt. Dated December 21, 2005
Reply to Office Action of September 21, 2005

the distributed X-ray source substantially surrounding the imaging volume". Further the Examiner also states with respect to Price, on page 14, line 19, "...fails to teach an imaging system comprising a stationary x-ray source in combination with a rotating detector". Thus the Examiner also clearly agrees that the x-ray source is not distributed around an imaging volume and that Price does not teach an embodiment where either one of source or detector is stationary.

Applicant respectfully submits that Burke does not teach, disclose or suggest the claim recitations of "volumetric" aspect of the data, as recited in the amended independent claims 1, 37, and 41, particularly as amended.

The embodiments disclosed in Burke are directed merely to reduce the rotational components in computed tomography imaging system (column 1, lines 15-65). It will be also be evident to one skilled in the art that Burke deals only with two dimensional data for image reconstruction and there is no disclosure, teaching or suggestion that may lead to the recitation of acquiring "volumetric data", as recited in the independent claims 1, 37, and 41.

Applicant further submits that the Burke reference does not disclose, teach or suggest the claim recitations of "a source controller for triggering one or more emitters in the at least one stationary distributed X-ray source for acquiring volumetric data by the at least one stationary detector", as recited in amended independent claims 1, 37, and 41.

Burke in column 7, lines 15-50, refers to a grid assembly for focusing the generated electron beam in a circumferential direction and radial direction. This results in the electron beam being stepped, or moved in other selected patterns, around the anode. But nowhere, does Burke disclose, teach or suggest the triggering of emitters, as recited in the independent claims 1, 37, and 41. The grid assembly and associated switching means of Burke are applied on the "generated" electron beam. In fact, Burke is completely silent on how the electron beam may be triggered.

Thus Price and Burke are both completely devoid of any teaching, disclosure or suggestion that can lead to the above mentioned claim recitations of independent claims 1, 37, and 41, as amended. Thus the Applicant respectfully submits that the independent claims 1, 37, and 41 as amended, are anticipated neither by Price nor by Burke under 35 U.S.C. §102 and therefore, are allowable. Claims 27-32 depend directly or indirectly from claim 1, claim 39 depends from claim 37, and claim 43 depends on claim 41. These dependent claims are similarly allowable.

In view of the foregoing remarks, Applicant respectfully requests withdrawal of the rejections under 35 U.S.C. §102 (b).

Appl. No. 10/816,015
Amdt. Dated December 21, 2005
Reply to Office Action of September 21, 2005

Under 35 U.S.C. §103 (a) rejections different sets of dependent claims as summarized above have been rejected over at least Price in view of Richey, Price in view of Dafni, Price in view of Dawson, Price in view of Hu, Price in view of Nambu, Burke, and Burke in view of Richey. Independent claim 37 has been rejected under 35 U.S.C 103 (a) over Price in view of Burke.

Richey merely describes an imaging system that utilizes an ECG signal to stabilize the cardiac period for triggering the traverse movement of a CT scanner, or for storing data only successive cardiac cycles or for gating the radiation beam (column 2, lines 5-20). Richey does not overcome the deficiencies of Price or Burke with respect to "distributed X-ray source", or with respect to "volumetric" aspect or with respect to "triggering one or more emitters" as recited in independent claims 1, 37 and 41.

Dafni discloses a helical scanning CT system having multiple X-ray sources mounted on a gantry, and an X-ray detector array located on a side of a subject opposite to each of the X-ray sources (column 3, lines 16-25). The detectors may be stationary and the X-ray sources are rotated around the subject. Dafni also does not overcome the deficiencies of Price with respect to the "distributed X-ray source" or with respect to the "triggering one or more emitters" as recited in independent claims 1, 37 and 41.

Dawson discloses an arrangement in which the X-ray tube may be moved to an angular position, thus moving the X-ray source and discloses a detector arrangement in the form of a ring (column 2, lines 40-45). Again Dawson does not overcome the deficiencies of Price with respect to the "distributed X-ray source" or with respect to the "triggering one or more emitters" as recited in independent claims 1, 37 and 41.

Hu merely discloses a volumetric CT system having a detector arrangement with two-dimensional array of detector elements arranged in separate rows disposed along a slice direction and separate columns disposed along an in-slice direction to overcome low signal problems and increase SNR (column 1, lines 64-67, column 2, lines 11-25). Hu also does not overcome the deficiencies of Price with respect to the "distributed X-ray source" or with respect to the "triggering one or more emitters" as recited in independent claims 1, 37 and 41.

Nambu discloses a helical scanning CT imaging system including a system for helically scanning the biological body as the body is translated along a Z-axis to obtain projection image data of the body along the helically scanned path (column 5, lines 60-65). Nambu also does not overcome the deficiencies of Price with respect to the "distributed X-ray source" or with respect to the "triggering one or more emitters" as recited in independent claims 1, 37 and 41.

Applicants further submit that all the three independent claims 1, 37 and 41 have been distinguished with respect Price and Burke separately when discussing 102 rejections above. Each of claims 2-36 depends from

Appl. No. 10/816,015
Amdt. Dated December 21, 2005
Reply to Office Action of September 21, 2005

claim 1, each of claims 38-40, depends from claim 37, and each of claims 42-44 depends from claim 41. Applicant believes that claims 1, 37, and 41 are in condition for allowance over Price and Burke for the reasons discussed above, regardless of what the other references teach or do not teach.

In view of the foregoing remarks, Applicant respectfully requests withdrawal of the rejections under 35 U.S.C. §103 (a).

Summary

In view of the foregoing, Applicant respectfully submits that the application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are respectfully requested.

Should the Examiner believe that anything further is needed to place the application in even better condition for allowance, the Examiner is requested to contact Applicant's undersigned representative at the telephone number below.

Respectfully submitted,

By



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